

||| Differentiation Rules

Exponential and Logarithmic Functions

Trigonometric Functions

$$16. \frac{d}{dx} (\csc x) = -\csc x \cot x$$

$$18. \frac{d}{dx} (\cot x) = -\csc^2 x$$

Inverse Trigonometric Functions

$$22. \frac{d}{dx} (\csc^{-1} x) = -\frac{1}{x\sqrt{x^2-1}}$$

$$23. \frac{d}{dx} (\sec^{-1} x) = \frac{1}{x\sqrt{x^2-1}}$$

$$24. \frac{d}{dx} (\cot^{-1} x) = -\frac{1}{1+x^2}$$

Hyperbolic Functions

$$28. \frac{d}{dx} (\operatorname{csch} x) = -\operatorname{csch} x \coth x$$

$$29. \frac{d}{dx} (\operatorname{sech} x) = -\operatorname{sech} x \tanh x$$

$$30. \frac{d}{dx} (\operatorname{coth} x) = -\operatorname{csch}^2 x$$

Inverse Hyperbolic Functions

$$31. \frac{d}{dx} (\sinh^{-1} x) = \frac{1}{\sqrt{1+x^2}}$$

$$32. \frac{d}{dx} (\cosh^{-1} x) = \frac{1}{\sqrt{x^2-1}}$$

$$33. \frac{d}{dx} (\tanh^{-1} x) = \frac{1}{1-x^2}$$

$$34. \frac{d}{dx} (\operatorname{csch}^{-1} x) = -\frac{1}{|x|\sqrt{x^2+1}}$$

$$35. \frac{d}{dx} (\operatorname{sech}^{-1} x) = -\frac{1}{x\sqrt{1-x^2}}$$

$$36. \frac{d}{dx} (\operatorname{coth}^{-1} x) = \frac{1}{1-x^2}$$